Japanese Patent Application Laid-Open No. 3-3030

Part #1; page 2, Upper left column, line 19 - page 2, Lower right column, line 3

(Prior Art and Associated Problems)

In the conventional offices or research institutes, a copying system adopts a method of copying with a copying machine shared among some people, a facsimile apparatus capable of copying, or a system in which a scanner and a printer are combined with a personal computer.

With the method of copying with the copying machine, the copying machine has a large size to occupy an installation place, or is often shared among some people due to a high price. When the copy is needed, the user goes to a copy site by once interrupting the work, whereby there was nonconformity of decreasing the work efficiency.

Also, there was further nonconformity that the facsimile can read only the sheet-like original (sheet feed type). In addition, when an OA equipment system is constructed of a personal computer and an image scanner, there was a problem that a large installation area was needed.

Also, conveying means for conveying the sheet in the copying machine has the drive rollers 71, 71 that are driven via a belt 72 by a motor 70, and the follower rollers 73, 73 that are disposed on the drive rollers 71, 71, so that the original sheet X, which is carried between both rollers, is conveyed due to a frictional force, as, as shown in Figure 8.

However, with this constitution, since at least the motor 70, the drive roller 71 and the follower roller 73 are required, a conveying mechanism is inevitably increased in size and weight, whereby it was impossible that the copying machine is mounted on desk side.

Also, with the conveying mechanism as shown in Figure 8, the original sheet is conveyed due to a frictional force between the drive roller 71 and the follower roller 73, whereby there was a problem that the stain on the original sheet X sticks onto the rollers 71, 73 to reduce the frictional force, causing a skid phenomenon and impeding secure conveyance to have adverse influences on the reading precision.

(Object of the Invention)

This invention has been achieved to solve the above-mentioned problems, and it is an object of the invention to provide a printer apparatus with a scanner in which the printer apparatus is made as compact as possible, and the image scanner is provided aside from the printer apparatus to be simply and easily mounted on desk side, whereby space saving is attained, the usability is increased and the reading precision is improved.

Part #2; page 5, Upper right column, line 10 - page 5, Lower right column, line 20

Referring to Figure 5, an internal structure of the printer apparatus with scanner 1 will be described below. Figure 5 is a cross-sectional view showing the printer apparatus with scanner

in a state where a scanner part 2 is mounted on the printer apparatus 3 as shown in Figure 2.

In Figure 5, a first conveying means Z_1 for conveying the print sheet P is disposed a predetermined spacing away from the bottom of the housing A of the printer apparatus 3. The upper surface of this conveying means Z_1 is flush with the lower surface of an insertion opening 3a and the lower surface of an exhaust opening 3b for the print sheet P formed in the housing A. If the print sheet P is inserted through the insertion opening 3a, a detection means 7 disposed above the opening detects the print sheet, and a detection signal is inputted into a PIA circuit 8 as shown in Figure 4, so that the first drive means Z_1 is driven to convey the print sheet P toward a printer head 9. In Figure 5, reference numerals 20 and 21 designate the follower rollers for pressing down the print sheet P to suppress the print sheet P from being deflected.

Further, a second conveying means Z_2 for conveying the original sheet is provided above the first conveying means Z_1. The upper surface of the second conveying means is flush with the lower surface of an insertion opening 5 and the lower surface of an exhaust opening 6 for the original sheet X. A sensor opening part 4 as shown in Figure 1 is formed in a concave part 3c for the housing A above an intermediate part of the second conveying means Z_2.

Further, the sensor opening part 4a communicates to a sensor opening part 2b bored on the bottom of the housing B for the scanner part 2 to form a sensor hole 4. An LED array 53 for light source is disposed obliquely above the sensor hole. A

light of the LED array is passed through the sensor hole 4 to illuminate the original sheet X laid and conveyed on the second conveying means Z_2. The image data of the original sheet X is read by an image scanner 2a disposed directly above the sensor hole 4.

In Figure 5, reference numerals 20b and 21b designate the part of the follower rollers serving as the operation rollers disposed on the bottom of the housing for the scanner part 2. A part of the follower roller 20, 21 is exposed out of a hole 80, 81 bored on the top of the housing A for the printer apparatus 3. The shaft center of the follower rollers is securely positioned in the housing B to lightly press down the original sheet X on the second conveying means Z2 from above.

And the follower rollers are rotated so that the original sheet X is conveyed in the arrow direction by the second conveying means Z_2. The follower roller 21 on one side rotates a rotary encoder 54 via a belt 21a, a photo-sensor 40 opposed to the rotary encoder 54 detects a rotation of the rotary encoder, and the LED array 53 for light source receiving a detection signal is turned on.